



# MODULE - 2

## SPRING JPA – SPRING JDBC- HIBERNATE

### Course Outline

#### Chapter 1 - Introduction

- 01 - Master Hibernate and JPA with Spring Boot - Preview
- 02 - Master Hibernate and JPA with Spring Boot - Installing Basic Tools
- 03 - Quick introduction to JPA

#### Chapter 2- Journey from Spring JDBC to JPA

- 01 - Setting up a project with JDBC, JPA, H2 and Web Dependencies
- 02 - Launching up H2 Console
- 03 - Creating a Database Table in H2
- 04 - Populate data into Person Table
- 05 - Implement findAll persons Spring JDBC Query Method
- 06 - Execute the findAll method using CommandLineRunner
- 07 - A Quick Review - JDBC vs Spring JDBC
- 08 - What's in the background? Understanding Spring Boot Autoconfiguration
- 09 - Implementing findById Spring JDBC Query Method
- 10 - Implementing deleteById Spring JDBC Update Method
- 11 - Implementing insert and update Spring JDBC Update Methods
- 12 - Creating a custom Spring JDBC RowMapper
- 13 - Quick introduction to JPA
- 14 - Defining Person Entity
- 15 - Implementing the findById JPA Repository Method
- 16 - Implementing insert and update JPA Repository Methods
- 17 - Implementing deleteById JPA Repository Method
- 18 - Implementing findAll using JPQL Named Query

## Chapter 3– JPA/Hibernate in Depth

- 01 - Create a JPA Project with H2 and Spring Boot
- 02 - Create JPA Entity Course
- 03 - Create findById using JPA Entity Manager
- 04 - Configuring application. properties to enable H2 console and additional logging
- 05 - Writing Unit Test for findById method
- 06 - Writing a deleteById method to delete an Entity
- 07 - Writing Unit Test for deleteById method
- 08 - Writing a save method to update and insert an Entity
- 09 - Writing Unit Test for the save method
- 10 - Quick Review and Debugging Tips
- 11 - Playing with Entity Manager
- 12 - Entity Manager Methods - clear and detach
- 13 - Entity Manager Methods - refresh
- 14 - A Quick Review of Entity Manager
- 15 - JPQL - Basics
- 16 - JPA and Hibernate Annotations - @Table
- 17 - JPA and Hibernate Annotations - @Column
- 18 - JPA and Hibernate Annotations - @UpdateTimestamp and @CreationTimestamp
- 19 - JPA and Hibernate Annotations - @NamedQuery and @NamedQueries
- 20 - Native Queries – Basics

## Chapter 4– Establishing Relationships with JPA & Hibernate – One to One

- 01 - Entities and Relationships - An overview
- 02 - Defining Entities - Student, Passport and Review
- 03 - Introduction to One to One Relationship
- 04 - OneToOne Mapping - Insert Student with Passport
- 05 - OneToOne Mapping - Retrieving Student with Passport and Eager Fetch
- 06 - OneToOne Mapping - Lazy Fetch
- 07 - Session vs Transaction
- 08 - OneToOne Mapping - Bidirectional Relationship - Part 1
- 09 - OneToOne Mapping - Bidirectional Relationship - Part 2

## Chapter 5- Establishing Relationships with JPA & Hibernate – One to Many and Many to Many

- 00 - ManyToOne Mapping - Designing the database
- 01 - ManyToOne Mapping - Retrieving and inserting Reviews for Course
- 02 - ManyToOne Mapping - Generalizing Insert Reviews
- 03 - ManyToOne Mapping - Wrapping up
- 04 - ManyToMany Mapping - Table Design
- 05 - ManyToMany Mapping - Adding Annotations on Entities
- 06 - ManyToMany Mapping - Fixing two join tables problem
- 07 - ManyToMany Mapping - Customizing the Join Table
- 08 - ManyToMany Mapping - Insert Data and Write Join Query
- 09 - ManyToMany Mapping - Retrieve Data using JPA Relationships
- 10 - ManyToMany Mapping - Insert Student and Course

## Chapter 6- Inheritance Hierarchies with JPA And Hibernate

- 01 - Introduction to Inheritance Hierarchies and Mappings
- 02 - JPA Inheritance Hierarchies and Mappings - Setting up entities
- 03 - JPA Inheritance Hierarchies and Mappings - Setting up a Repository
- 04 - JPA Inheritance Hierarchies and Mappings - Single Table
- 05 - JPA Inheritance Hierarchies and Mappings - Table Per Class
- 06 - JPA Inheritance Hierarchies and Mappings - Joined
- 07 - JPA Inheritance Hierarchies and Mappings - Mapped Super Class
- 08 - JPA Inheritance Hierarchies and Mappings - How to Choose?

## Chapter 7- Queries with Entities Using JPQL

- 00 - JPQL - Courses without Students
- 01 - JPQL - Courses with at least 2 Students and order by
- 02 - JPQL - Courses like 100 s
- 03 - JPQL - Using Joins

## Chapter 8- Queries Using Java API - Criteria Queries

- 01 - Criteria Query - Retrieving all courses
- 02 - Criteria Query - Courses like 100 s
- 03 - Criteria Query - Courses without Students
- 04 - Criteria Query - Using Joins

## Chapter 9- Transaction Management

- 01 - Introduction to Transaction Management
- 02 - Transaction Management - ACID Properties
- 03 - Understanding Dirty, Phantom and Non-Repeatable Reads
- 04- Understand 4 Isolation Levels
- 05 - Choosing between Isolation Levels
- 06 - Implementing Transaction Management - 3 Things to Decide

## Chapter 10- Spring Data JPA & Spring Data Rest

- 01 - Introduction to Spring Data JPA
- 02 - Testing the Spring Data JPA Repository with findById.
- 03 - Spring Data JPA Repository - CRUD Method
- 04 - Sorting using Spring Data JPA Repository
- 05 - Pagination using Spring Data JPA Repository
- 06 - Custom Queries using Spring Data JPA Repository
- 07 - Spring Data REST

## Chapter 11- Caching with Hibernate & JPA

- 01 - Introduction to Caching
- 02 - Hibernate and JPA Caching - First Level Cache
- 03 - Hibernate and JPA Caching - Basics of Second Level Cache with EhCache
- 04 - Hibernate and JPA Caching - Second Level Cache Part 2

## Chapter 12- Hibernate & JPA Tips

- 01 - Hibernate Tips - Hibernate Soft Deletes - @SQLDelete and @Where
- 02 - Hibernate Soft Deletes - Part 2
- 03 - JPA Entity Life Cycle Methods
- 04 - Using Embedded and Embeddable with JPA
- 05 - Using Enums with JPA
- 06 - JPA Tip - Be cautious with toString method implementations
- 07 - JPA Tip - When do you use JPA?

## Chapter 13- Performance Tuning Tips with Hibernate & JPA

- 01 - Performance Tuning - Measure before Tuning
- 02 - Performance Tuning - Indexes
- 03 - Performance Tuning - Use Appropriate Caching
- 04 - Performance Tuning - Eager vs Lazy Fetch
- 05 - Performance Tuning - Avoid N+1 Problems

## Chapter 14- Few More FAQ

- FAQ 1 - How to connect to a different database with Spring Boot?
- FAQ 2 - Approach to design great applications with JPA?
- FAQ 3 - Good Practices for developing JPA Applications

### Course Requirements

- You have an attitude to learn while having fun
- You have programming experience with Java, Spring

### Course Outcome

- You will learn the basics of JPA and Hibernate - Entities, Relationships, Inheritance Mappings and Annotations
- You will understand approaches to querying data using JPA and Hibernate - JPQL, Criteria API and Native Queries
- You will understand JPA and Hibernate Relationships in-depth - One to One, Many to One and Many to Many
- You will use a variety of Spring Boot Starters - Spring Boot Starter Web, Starter Data Jpa, Starter Test
- You will learn the basics of performance tuning your JPA application with Hibernate - Solve N+1 Queries Issue.
- You will learn the basics of caching - First Level Cache and Second Level Cache with EhCache
- You will understand the basics of Spring Data JPA and Spring Data REST